



National Center of Excellence in Aviation Operations Research (NEXTOR)

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The Operations Research Problem in Aviation

- *The National (and international) Airspace System is a complex system of systems*
- *Interactions among aircraft, the system, and the economy are poorly understood*
- *NEXTOR applies the tools and disciplines of operations research to this complex set of questions*

Some Problems for OR in Aviation

- *What mechanisms transform aviation investment into economic growth in communities?*
- *What are the (perhaps unforeseen) consequences of policy decisions with respect to:*
 - *Control of resource utilization?*
 - *Investment in infrastructure?*
 - *Adjustment of tax base and rates?*
- *Impact of equipment outages on system performance?*
- *To mention only a few...*

NEXTOR is tackling all these
questions today....

NEXTOR

- *Founded June 26, 1996*
- *Consortium of world-class universities, public sector and private industry partners*
- *Advances operations research in aviation and air traffic systems*
- *Serves as the FAA's primary independent source for academic study and review of multi-dimensional system impacts*
- *Expands community understanding of OR issues through workshops, seminars, and educational programs*

NEXTOR's Contribution

- *NEXTOR supports Congress' mandate to broaden universities' capabilities in developing a pool of talented research scientists and engineers*
- *Since its inception, NEXTOR has:*
 - *produced over 1,000 technical papers*
 - *Provided opportunities for over 100 graduate students to advance their education and careers*
 - *Enabled more than 25 NEXTOR-supported Doctorates in Aviation OR*

Past NEXTOR RESEARCH STUDIES

- *Airports and Air Quality: Emission, Conformity, and Mitigation*
- *Collaborative Decision Making (CDM)*
- *NEXT Generation Satellite Systems for Aeronautical Communications (NGSS)*
- *Integration of Reusable Launch Vehicles into Air Traffic Management*
- *Airport Surface Movement Enhancement/runway Incursion Prevention Investment Analysis*
- *Analysis of Aircraft Separation and Collision Risk Modeling*
- *Analytical Support for the Global Aviation Information Network*
- *Positive Passenger Bag Match*

CURRENT RESEARCH PROJECTS

- *Interactive Simulation (“wargaming”) of policy options for control of capacity utilization at constrained airports*
- *Analysis of system performance and economic impacts from infrastructure investment and airspace reconfiguration*
- *Methodology for En-Route Sector Performance and En-Route Delay Assessments*
- *Air Traffic Flow Management Under Uncertainty and Dynamic Conditions*
- *Methodology for Assessment of Unstaffed Facilities for the NAS Infrastructure Assets*



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